Migration and Building of Data Centers in IBM SoftLayer with the RackWare Management Module

June, 2015

WHITE PAPER

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Advantages of IBM SoftLayer and RackWare Together

IBM SoftLayer offers customers the advantage of migrating and building complex environments into their infrastructure. RackWare allows these customers to build, configure and replicate these complex environments easily and quickly. When these environments need to be customized, customers can simply punch in those desired changes into the RMM tool during replication to allow complex, yet customized migrations and expansions to occur.

Relationship between RackWare and IBM

RackWare and IBM have had a successful partnership since 2013. RackWare has invested in integration efforts with IBM SoftLayer features and has jointly sold with IBM to help support enterprises in their migration and Cloud DR projects using IBM SoftLayer.

About the RackWare Management Module (RMM)

RMM is a software product that decouples the application stack from the underlying platform allowing it to be ported to any new platform. RMM includes discovery, analysis and automation features allowing the migration process to be fast, easy and error-free. Hundreds of customers have moved thousands of workloads between platforms and between internal and cloud environments using RMM. RMM also offers replication, sync and monitoring features that permit cost-effective Cloud DR deployments.

How Enterprises can Leverage IBM SoftLayer as an Extension of their Internal Environments

RMM 3.0 provides out-of-the-box integration with SoftLayer's management APIs as well as their unique features such as Powercontrols, Autoscaling and Autoprovisioning to enable customers to provision complex workloads with push button simplicity and rapid acceleration.

Popular Use Cases for RMM and SoftLayer

1. Migration of complex workload environments to SoftLayer - Advantage: dramatic reduction in complexity as well as speed of migration – from 20 weeks to 1 week
2. Expansion of environments within SoftLayer - Advantage: with the help of gold images and SoftLayer's features such as Powercontrols, Autoscaling and Autoprovisioning,

RMM rapidly replicates servers into new environments to help with speedy and error-free expansion.

3. Disaster Recovery to SoftLayer – Advantage: get enterprise-class disaster recovery at a fraction of the cost by protecting critical workloads using SoftLayer as the recovery site. RMM's failure detection, replication, failover and failback features provide automated recovery from failures, allowing business to go on despite failures.

Real-world ROI Calculation for a Data Center Migration by RackWare

Number of Servers Migrated	Hours Taken Without RMM	Hours Taken With RMM	Hours Saved	$$ saved in admin costs ($125/hour)
50	800 (20 weeks)	40 (5 days)	760	$95,000.00
			RMM License costs for 50 servers ($500 per server)	$25,000.00
Time saved in migrating 50 servers	**760 hours**		**Total $$ savings in migrating 50 servers**	**$70,000.00**
Migration time saved by RMM	**15.2 hours per server**		**$$ saved by RMM**	**$1400.00 per server**

SoftLayer and RMM Integrations for fast and convenient migrations, expansions and Cloud Disaster Recovery

RMM AND SOFTLAYER FEATURES	BENEFITS
RMM'S ABILITY TO MIGRATE COMPLEX ENVIRONMENTS IN BULK WITH PUSH-BUTTON SIMPLICITY	Reduce time involved in migrating environments from 10 weeks to 2-3 days for 50 servers; increased convenience from automating complex manual tasks
RMM'S FAILURE DETECTION, FAILOVER AND FAILBACK FEATURES	RMM allows for monitoring the health of an application, synchronizing the state and data to a SoftLayer site, and failing over the application to SoftLayer in the event of a failure.

RMM'S INTEGRATIONS WITH SOFTLAYER MANAGEMENT API	Can invoke SoftLayer's API to manage the server, e.g. insert SSH keys, run scripts during provisioning, change passwords or insert certificates.
RMM'S INTEGRATION WITH SOFTLAYER POWERCONTROLS	This allows RMM to power cycle the machines both virtual guests as well as bare metal.
RMM'S INTEGRATION WITH SOFTLAYER AUTOSCALING	This allows RMM to scale workloads within SoftLayer based on usage.
RMM'S INTEGRATION WITH SOFTLAYER AUTOPROVISIONING FOR AUTOSCALING	RMM can automatically provision or decommission virtual guests or bare metal infrastructure based on usage of the workload.
RMM'S INTEGRATION WITH SOFTLAYER AUTOPROVISIONING FOR MIGRATION	RMM can automatically provision virtual guests or bare metal infrastructure for migrating workloads into SoftLayer.
RMM'S INTEGRATION WITH SOFTLAYER STORAGE	RMM allows for attaching the different types of storage during autoprovision, NAS, Local Block Storage, NFS.
RMM'S INTEGRATION WITH SOFTLAYER MONITORING	Can configure SoftLayer's monitoring tool on a particular server.

The use cases above will become clearer with the customer example below that highlights step by step what the processes for datacenter migration to SoftLayer are.

Customer Example: Company A Migrates 50 Servers to SoftLayer

Company A is a customer that with legacy onsite infrastructure consisting of 50 servers and needs to migrate to SoftLayer without any downtime. Customer, partners and employees use the web application to collaborate with each other using a mobile API's and a rich web interface. As monthly sales are announced, demands generates large amounts of traffic to the site resulting in latency in the customers' experience.

Application Architecture

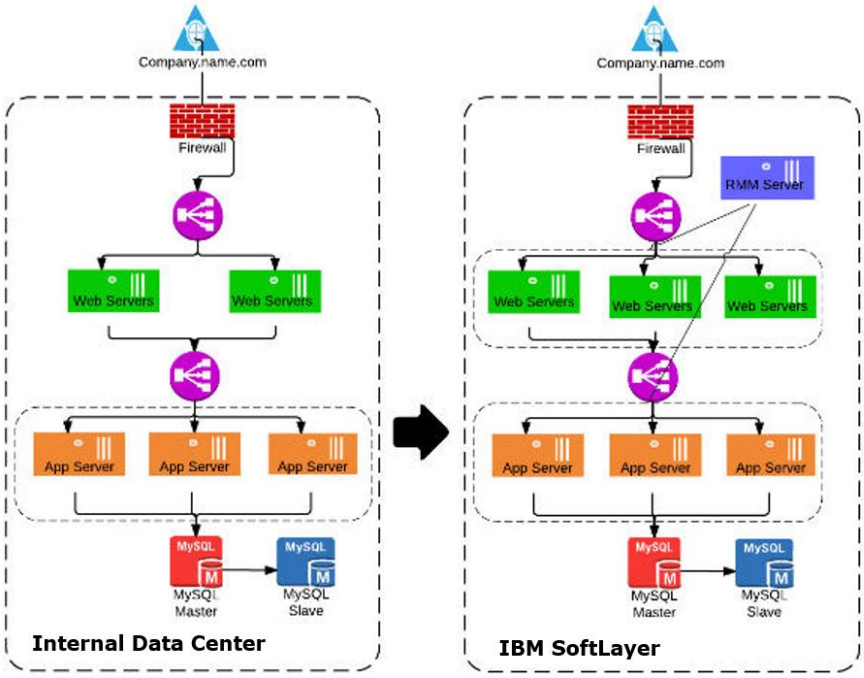
Using a standard 3-tier application architecture, Company A deploys a frontend hardware-based load balancer, which manages traffic across two Apache web servers. The application is

running behind a company firewall (DMZ) and uses standard SSL encryption. The backend business logic is implemented in Java, and leverages Tomcat as the application container and application server, and three Tomcat servers power the website. The application also has a database layer which consists of one master MySQL server and a slave server for greater performance.

RackWare's SoftLayer Migration Plan & Execution Steps for Company A

Cloud Assessment

During the technical assessment, RMM software performed a discovery of the entire CompanyA.com technology stack to determine the most efficient migration process to



Before Migration **After Migration**

SoftLayer.

Discovery

The migration team ran RMM's **agentless** discovery services to map the relationships CompanyA.com ecosystem between firewalls, load balancers, web servers, application servers and MySQL DB. The dependence mapping was able to show ports as well as the number of connections between tiers. RackWare's RMM discovery engine was able to monitor performance over time to make recommendations on target sizing.

Capture

RMM has file capture technology, supporting Windows or Linux, application, web and DB x86 architectures, without an agent. The **agentless live capture** was achieved without taking the workload off-line or installing software. RMM captured the complete operating system, application stack and data in single or multiple images. During the capture, RMM removed all source hardware dependences. By removing source dependences including network address and hardware drivers, RMM allows the source workload to be migrated to any new target environment.

Cloud Onboarding

RMM for IBM SoftLayer includes pre-built integrations with SoftLayer to support **automatically creating SoftLayer images** from the requirements gathered during the discovery of the target resources. RMM gives users the option to modify the images prior to its creation. The automation removes all manual steps with creating a portable server image prior to migrations. Rackware can inherit the target network addresses during the Onboarding processing. Inheriting target networks addresses allows for rapid transition into SoftLayer. RMM's instrumentation can build SoftLayer Load Balancers and server groups from within the RMM interface.

Assigning

RMM is a point to point migration technology. The technology only requires a single configurable port to be used during migration. Once the target images have been assigned to the SoftLayer target, Rackware is able to overwrite the SoftLayer destination image with the source Image. During this overwrite RackWare is able to inject drives into the captured image and inherit target network addresses. Rackware has pre and post plugin's that can be executed to automate IP's connections with SoftLayer load balancers and automate adding host names to SoftLayer directory services.

Replication and Sync

RMM has a built in **live replication and delta syncing** technology with scheduling and policy assignments. This will allow the target to remain running during the sync, with no disruption to service. Individual sync policies enable users to setup sync for DB, application and web tiers on distinctive schedules. The delta engine enable fast migration of only the changed files. Additionally, users can granular select files of directory to select for sync or not to sync. It's recommended to setup a sync policy to insure source and target at kept current.

Phased Migration

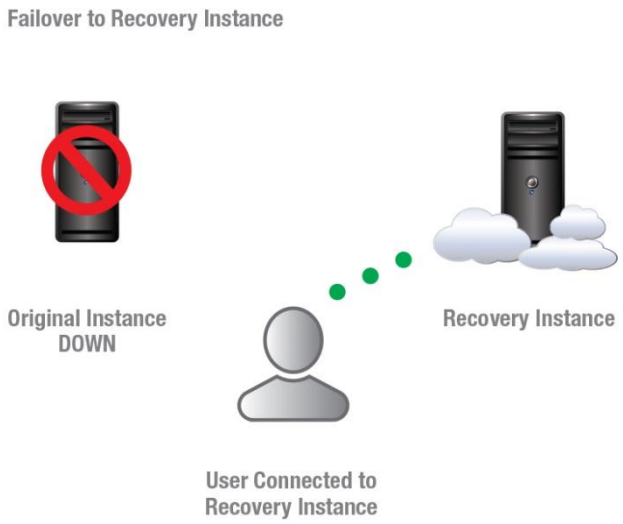
During the migration phase Company A has migrated copies of web and application to SoftLayer. Company A has a **phased migration strategy**. The configuration of the on-premise hardware load balancer was modified to send traffic to send request to the new instances in the cloud. After verifying that the servers in the cloud were performing at required levels. The onsite servers were dismissed one by one.

Cut Over

With the nightly sync policy the final cutover was accomplished in a short change window. This change window can be live with the source web site still operational or can be taken off line.

Cloud Disaster Recovery using RMM for IBM SoftLayer

Rackware provides a Disaster Recovery solution that builds on its image mobility and elasticity features to bring economic Disaster Recovery for the hybrid cloud. The origin Host Image can reside in remote storage (at the origin site) or on the local disk. If the Image resides on the local disk, the RMM configures the logical volume manager on the Host and is used to take periodic snapshots of the Image. In the background, the RMM image sync operation synchronizes any changes in the image with the image at the DR site. The overhead on the origin Host is extremely small involving only resources to take a **delta snapshot**. Thus the data overhead of the WAN link incurs only the delta of information, keeping bandwidth needs and sync time to a minimum. RMM ensures that image updates include user data, Operating System updates, and application installations and configuration changes so that the recovery image behaves exactly like the production image should a failover occur. While OS updates are more infrequent it is still important to ensure that kernel patches are kept in sync with the DR Image. When updating the OS, an image refresh operation is done from the RMM first before the sync to the SoftLayer virtual guests or bare metal infrastructure. Should the product system be compromised or inoperable, RMM automatically launches the recovery image in SoftLayer and the image starts running with the latest synchronized changes.



After the production instance is repaired and operational, it's easy to restore the origin site with any up to date changes made to the image in the cloud. When the origin site is restored to its operational state, the administrator can utilize the capture from cloud feature to refresh the original Image and synchronize any changes that occurred during the outage.

Summary: SoftLayer allows customers to migrate entire data center environments into their infrastructure. RackWare allows these customers to build, configure and replicate these complex environments easily and quickly. When these environments need to be customized, customers can simply punch in those desired changes into the RMM tool during replication to allow complex, yet customized migrations and expansions to occur.

Conclusion

By investing in RMM for IBM SoftLayer Company A was able to:

- Successfully migrate an existing web application to the SoftLayer with minimal downtime to their current production environment and shaved weeks off their original manual schedule.
- Save on an average of 15.2 hours per server during the migration process.
- Save on an average of $1400.00 per server during the migration process.
- Use SoftLayer for DR of its crucial applications at 1/10 the price of traditional DR.

Using a phased approach, the migration team was able to resolve all the financial, technical and business concerns.

About RackWare

RackWare allows enterprises to use the public cloud as just another resource for their internal infrastructure — for disaster recovery, as well as scaling purposes. With its unique ability to be platform and cloud agnostic, RackWare's flagship solution, the RackWare Management Module (RMM), allows workloads to be ported between any platform, virtual or physical, and any cloud. RackWare has moved thousands of workloads for hundreds of customers and has partnerships with large Service Providers and VARs. RackWare was founded in 2009 and is based in Milpitas, California. For more information, go to: www.rackwareinc.com.